

Florence Nonattainment Area

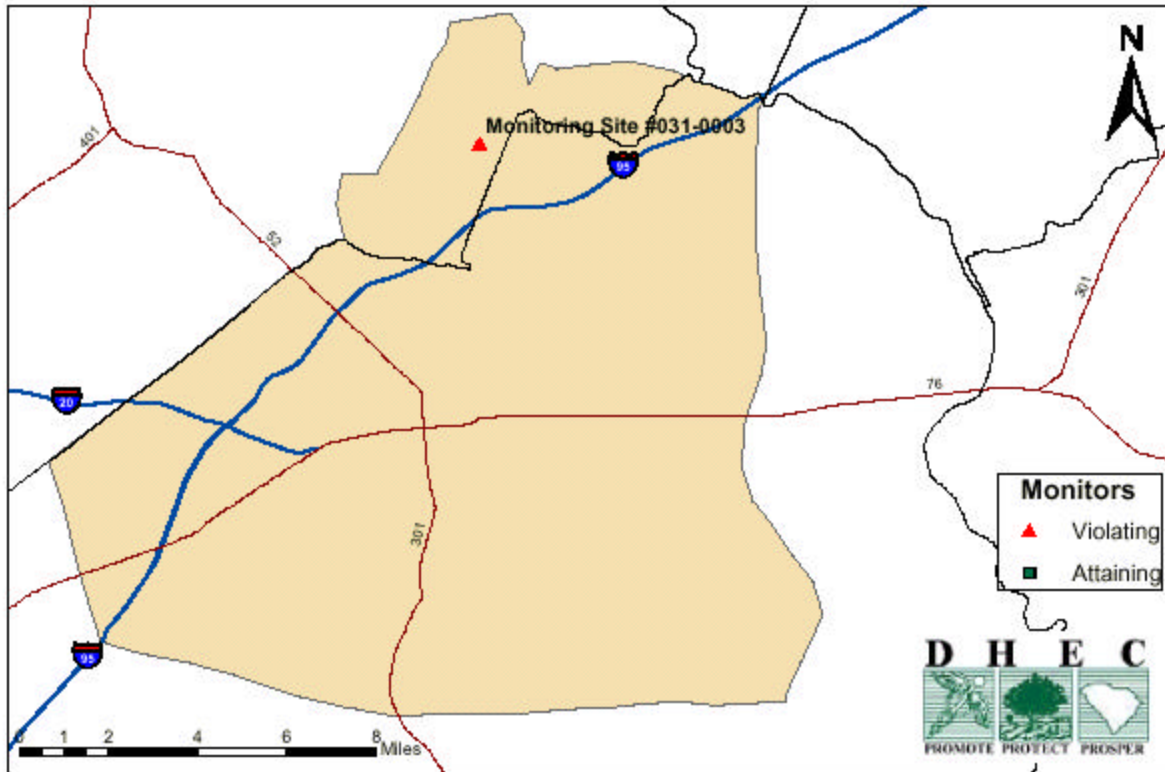


Figure 1: Florence Nonattainment Area Map

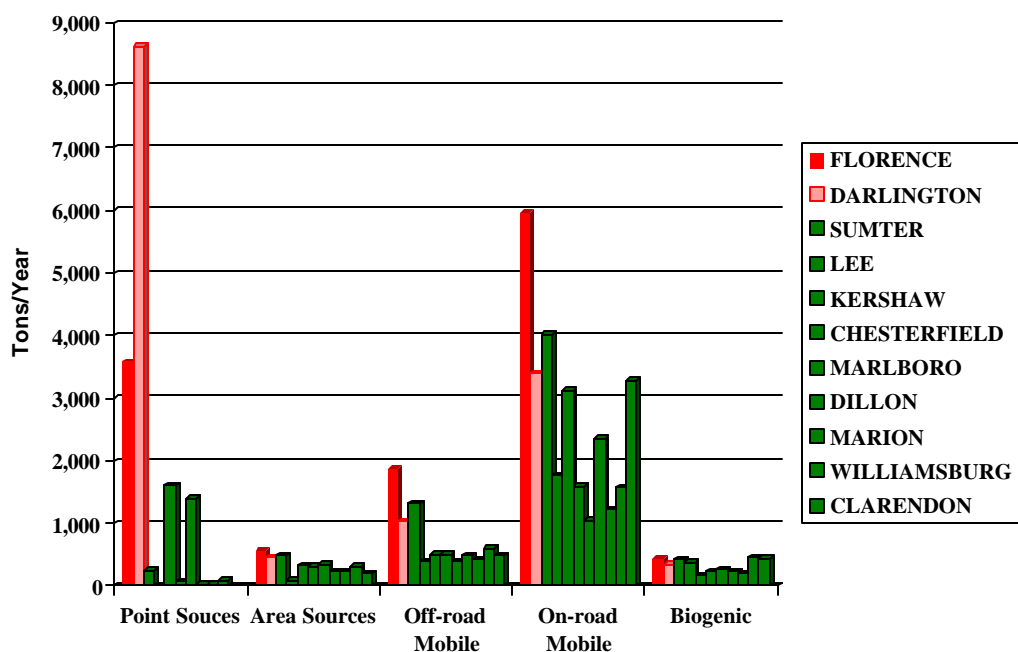
The South Carolina Department of Health and Environmental Control (Department) recommends that the area encompassed by the boundaries of the Florence Metropolitan Planning Organization (MPO) and a portion of Darlington County be designated a nonattainment area for violating the 8-hour ozone National Ambient Air Quality Standard (air quality standard) based on 2000 through 2002 monitoring data. This recommended area will be referred to as the Florence Nonattainment Area throughout the rest of this document.

The proposed Florence Nonattainment Area boundary captures 43% of the population of Florence and Darlington Counties. The portion not captured within the recommended boundary is predominately rural, particularly as 55% of Darlington County residents live in non-urban areas. There are two major NO_x sources in Darlington County, both of which are located outside the proposed boundary. However, both are subject to the NO_x SIP Call. One has a 2004 ozone season budget estimated at 458 tons and the other has 2004 ozone season emissions estimated at 723 tons. There is major NO_x one facility in Florence County, which is located outside the proposed boundary. However, it is subject to the NO_x SIP Call and it has 2004 ozone season emissions estimated at 1,366 tons. The recommended boundary captures 47% of the daily vehicle miles traveled and it is estimated that this number will remain constant in 2025. The monitor in the proposed boundary sits just across the Florence County line in Darlington County. This monitor is marginally violating the 8-hour ozone standard. Also, the Department operates an ozone monitor in Williamsburg County, southeast of Florence. This monitor indicates attainment of the ozone standard, supporting the recommended boundary for the Florence area.

The Department is submitting this document to provide detailed information pertaining to the factors which EPA suggested be addressed in support of any nonattainment area designation recommendations.

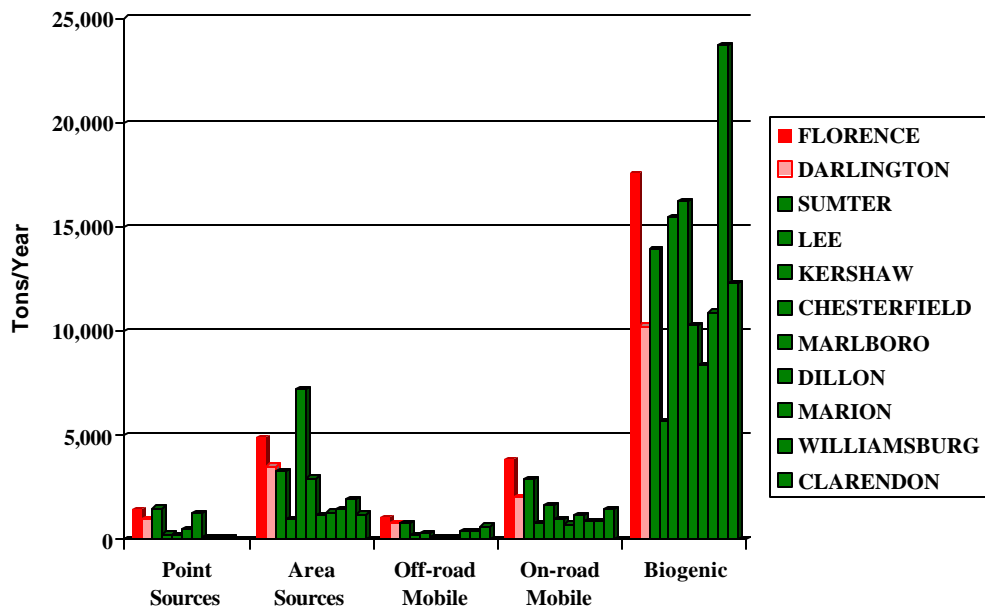
A. Emissions and Air Quality in Adjacent Areas (Including Adjacent MSAs)

Figure A-1: NOx Sources for Florence, Darlington and Adjacent Counties*



* Order of bars corresponds with order of counties in legend.

Figure A-2: VOC Sources for Florence, Darlington and Adjacent Counties*



* Order of bars corresponds with order of counties in legend.

To evaluate the emissions in Florence and Darlington Counties and the adjacent areas, the Department utilized the estimated annual 1999 oxides of nitrogen (NO_x) and volatile organic compounds (VOC) emissions. The types of NO_x and VOC emission sources that were evaluated include point, area, biogenic, and on-road and off-road mobile sources. Figures A-1 and A-2 show the percentage of emissions from each source category for Florence and Darlington and surrounding South Carolina counties. Additional emissions inventory information is provided in Section D.

The Department has one ozone-monitoring site in the Florence Nonattainment Area with three years of data. Only Florence County is a part of the Florence MSA. Air quality information is provided in Section C.

B. Population Density and Degree of Urbanization Including Commercial Development (Significant Difference from Surrounding Areas)

According to the US Census, urban is defined as all territory, population, and housing units in urbanized areas and urban clusters. An urbanized area is defined as a densely settled area that has a census population of at least 50,000, and an urban cluster is defined as a densely settled area that has a census population of 2,500 to 49,999. An urban area is a generic term that refers to both urbanized areas and urban clusters. Rural is defined as all territory, population, and housing units located outside of urbanized areas and urban clusters.

Florence County is 800 square miles and had a population of 125,761 in 2000. The current population density is 157.2 persons per square mile. The majority of Florence County is urban as 58% of Florence

County residents live in the urban area (either urbanized areas or urban clusters). The Florence County portion of the recommended area had a population of 78,676 in 2000. The recommended area encompasses about 63% of the population of Florence County. Covering 194.7 square miles, the recommended area has a population density of 404.2 persons per square mile.

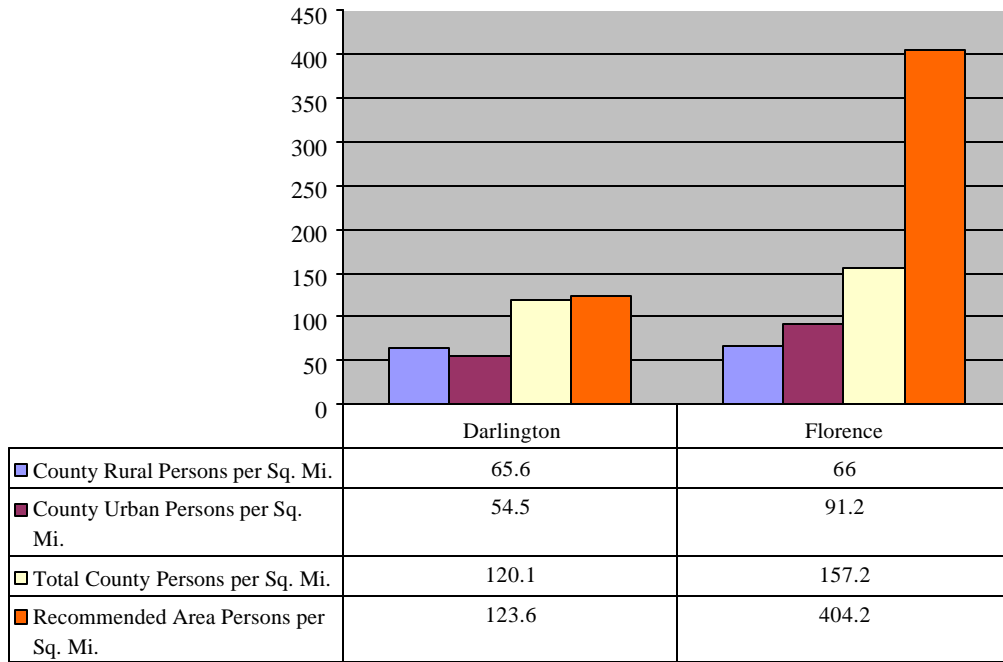
Darlington County is 561 square miles and had a population of 67,394 in 2000. The current population density is 120.1 persons per square mile. The majority of Darlington County is rural as 54.6% of the county population lives in non-urban areas. The Darlington County portion of the recommended area is estimated to be about 28 square miles and the population is estimated to be about 3,460 people. Based on these two estimates, the population density for the Darlington County portion of the recommended area is 123.6 persons per square mile.

Table B-1: Total Population, Land Area, and Urban/Rural Population, 2000				
	Florence County	Recommended Area of Florence County	Darlington County	Recommended Area of Darlington County
Population ¹	125,761	78,676	67,394	3,460
Land Area (Square Miles) ¹	800	194.7	561	28
Persons per Square Mile ¹	157.2	404.2	120.1	123.6
Urban Population ²	72,929	Unknown at this time	30,579	Unknown at this time
% Urban Population ²	58	Unknown at this time	45.4	Unknown at this time
Rural Population ²	52,832	Unknown at this time	36,815	Unknown at this time
% Rural Population ²	42	Unknown at this time	54.6	Unknown at this time
* The data for the recommended area of Darlington County is based on assumptions and is only estimates. The actual data may be greater than or less than the data provided.				

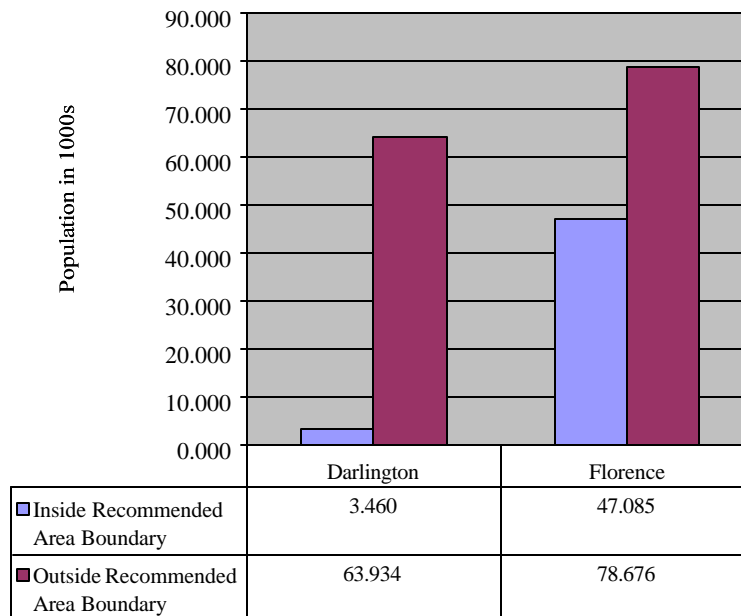
¹ Data provided by US Census: 2000 Portions of the data for the recommended area were obtained from the SCDOT.

² Data provided by SC Office of Research and Statistics.

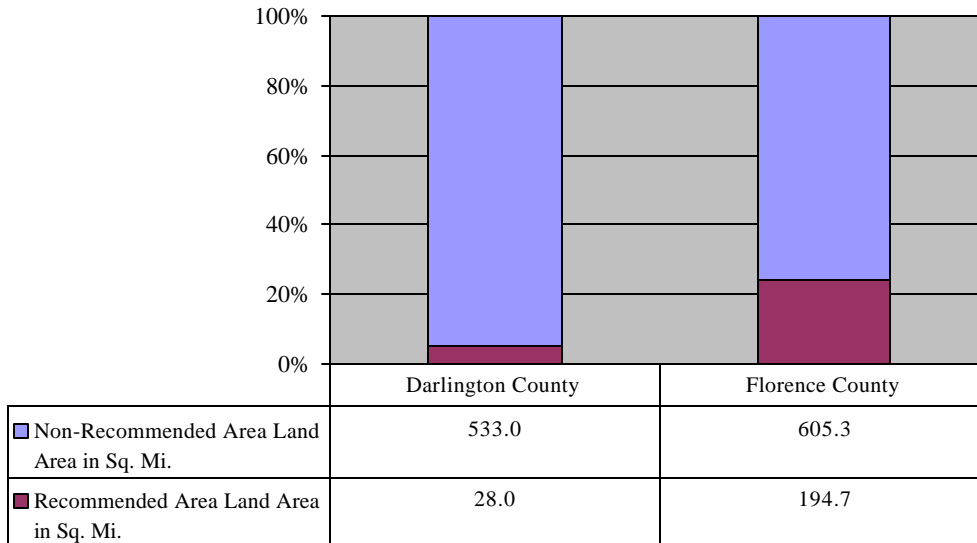
**Figure B-1: Population Density, 2000
(Persons per Square Mile)**



**Figure B-2: Population Distribution
Relative to Recommended Area Boundaries, 2000**



**Figure B-3: Land Area Distribution
According to Recommended Area Boundaries, 2000**



Figures B-1, B-2, and B-3 show the population density distribution, land area distribution, and population distribution, respectively, for Florence and Darlington Counties relative to the Florence Nonattainment Area boundaries.

According to the US Census, manufacturing is defined as the mechanical, physical, or chemical transformation of materials or substances into new products. The assembly of components into new products is also considered manufacturing, except when it is appropriately classified as construction. Establishments in the manufacturing sector are often described as plants, factories, or mills and typically use power-driven machines and materials-handling equipment. Also included in the manufacturing sector are some establishments that make products by hand, like custom tailors and the makers of custom draperies. While manufacturers typically do not sell to the public, some establishments like bakeries and candy stores that make products on the premises may be included. The retail trade sector comprises establishments engaged in retailing merchandise, generally without transformation, and rendering services incidental to the sale of merchandise.

The Florence Nonattainment Area contains a large majority of the economic development in both Florence and Darlington Counties. Sixty-six percent of the manufacturing employees in Florence County are contained inside of the Florence County portion of the recommended area boundary. The number of manufacturing employees in the Florence County portion of the recommended area (8,247 persons) outnumbers the number of manufacturing employees in the whole of Darlington County (8,145 persons) by one hundred two persons. Also, 89 out of 116 manufacturing establishments in Florence County, or 76.7%, are located inside the recommended area boundary. There is no data available to compare the location of retail trade establishments in Florence and Darlington Counties to the boundaries of the recommended area. It is reasonable to assume that a majority of the retail trade, like the manufacturing

sector, is contained inside the boundary, particularly for Florence County.

Tables B-2, B-3, and B-4 contain the manufacturing and retail trade data for Florence and Darlington Counties and the Florence Nonattainment Area.

	Table B-2: Total Number of Manufacturing Employees, 2000³		
	In Recommended Area Boundary	In County Boundary	Percent in Recommended Area Boundary
Florence	8,257	12,428	66.44%
Darlington	0	8,145	0.0%
Total	8,257	20,573	40.14%

	Table B-3: Total Number of Manufacturing Establishments, 2000³		
	In Recommended Area Boundary	In County Boundary	Percent in Recommended Area Boundary
Florence	89	116	76.72%
Darlington	0	50	0.0%
Total	139	166	83.73%

	Table B-4: Retail Trade Patterns, 2000⁴	
	Number of Employees	Number of establishments
Florence Co.	26,275	1,860
Darlington Co.	4,671	367
Total	30,946	2,227

³ Data from Bureau of Air Quality "SC Company File1.xls," based on 2001.

⁴ Data provided by the US Census: 2000.

Figure B-4: Distribution of Manufacturing Employees, 2000

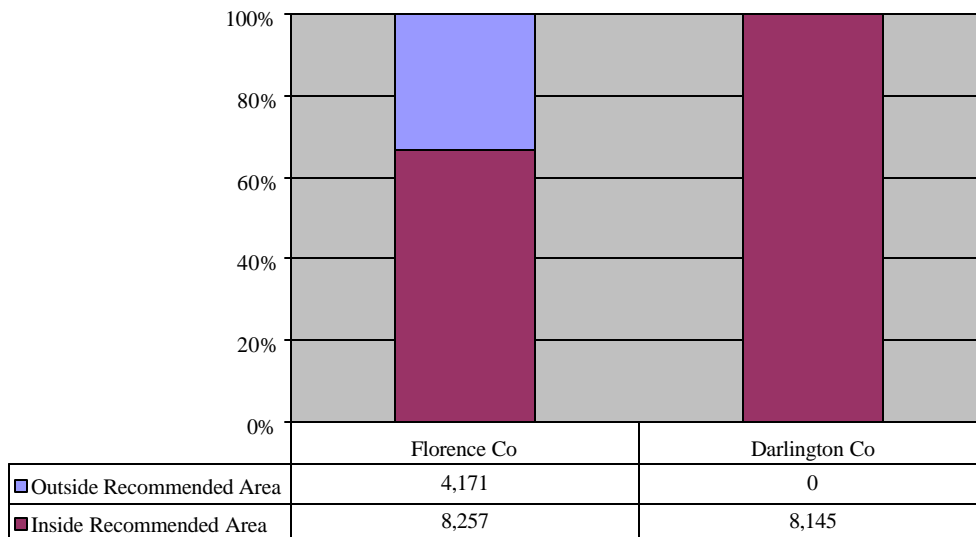


Figure B-4 shows the distribution of manufacturing employees relative to the recommended nonattainment boundaries

C. Monitoring Data Representing Ozone Concentrations in Local Areas and Larger Areas (urban or regional scale)

The Florence Nonattainment Area Map (Figure 1) shows the ozone monitoring station. A neighboring ozone monitor is located in Williamsburg County. The Darlington County ozone monitoring station (Pee Dee Experimental Station 45-031-003) is located on Road 21-26 in Darlington County and is approximately 39 meters above sea level. It was established in 1993. Ozone concentrations there are measured continuously (all year). The land surrounding this monitor is used for agriculture. The monitor lies approximately 0.5 miles west of the Florence County line and less than 1.5 miles by air to I-95. According to the South Carolina Department of Transportation (SCDOT) traffic count for 1993 shows that five hundred (500) vehicles per day accessed the road. The nearest schools are 5 miles south of the site and the nearest industry is a concrete plant on I-95, approximately 2 miles south of the site. The monitoring objective for Pee Dee Experimental Station is to measure ozone concentrations for general/background.

The Williamsburg County ozone monitoring station (Indiantown 45-089-0001) is approximately 15 to 20 miles away from the southern Florence County line, which supports a partial Florence County boundary since the monitoring site indicates attainment with the 8-hour ozone standard. The monitoring objective is to measure the ozone concentration for general background.

Table C-1 presents the 2000 through 2002 8-hour ozone monitoring data for Darlington and Williamsburg Counties. The design value is the annual fourth-highest daily maximum 8-hour ozone concentration, expressed in parts per million (ppm), averaged over three consecutive years. Since the

2002 ozone design value for the Pee Dee Experimental Station monitoring site is 0.086 ppm, the site is marginally exceeding the 8-hour ozone standard.

Table C-1: Florence and Surrounding Area Ozone Monitoring Data						
County	Site ID	Site Name	4 th Maximum 8-Hour			Design Value
			2000	2001	2002	
Darlington	45-031-0003	Pee Dee Exp. Station	0.087	0.081	0.090	0.086
Williamsburg	45-089-0001	Indiantown	0.077	0.067	0.077	0.073

Table C-2 contains the 2000 through 2002 daily maximum ozone concentrations above 0.084 ppm for the Darlington and Williamsburg County monitoring stations. A period indicates that no exceedance occurred on the same day at that location.

Table C-2: Pee Dee Experimental Station and Indiantown Sites		
Date of Exceedance	Florence Daily Maximum 8-hour Average ppm	Williamsburg Daily Maximum 8-hour Average ppm
06/02/2000	0.1	.
06/03/2000	0.095	.
07/19/2000	0.09	.
08/18/2000	0.087	.
2000 Total Hits	4	0
08/23/2001	0.085	.
2001 Total Hits	1	0
05/24/2002	0.086	.
05/25/2002	0.099	.
06/03/2002	0.09	.
06/10/2002	0.086	.
07/03/2002	0.085	.
07/18/2002	0.094	.

Table C-2: Pee Dee Experimental Station and Indiantown Sites		
Date of Exceedance	Florence Daily Maximum 8-hour Average ppm	Williamsburg Daily Maximum 8-hour Average ppm
08/23/2002	0.088	.
09/11/2002	0.095	.
2002 Total Hits	8	0

D. Location of Emission Sources

Table D-1 lists the NO_x point sources that are in operation in Darlington and Florence Counties based on the 1999 NO_x and VOC emissions inventory iSteps data. Darlington County has 12 NO_x point sources in operation. None of these point sources are located within the nonattainment area. Florence County has 18 NO_x point sources in operation and 13 of these point sources are located within the nonattainment area. Facilities in **Red** are within the proposed boundary; facilities in Black are outside the proposed boundary.

Table D-1: Darlington & Florence Counties Point Source NO2 Emissions				
County	Plant Name	Permit Number	Pollutant	Point Source-NO2 (Tons Per Year)
Darlington	Chesterfield Lumber	0820-0045	NO2	20.90
Darlington	CP&L: Robinson	0820-0002	NO2	5,010.35
Darlington	Darlington Shredding	0820-0014	NO2	4.39
Darlington	Darlington Veneer	0820-0011	NO2	1.16
Darlington	Galey&Lord: Society Hill	0820-0010	NO2	485.51
Darlington	Georgia-Pacific Corp	0820-0006	NO2	6.51
Darlington	Hartsville Oil Mill	0820-0008	NO2	13.19
Darlington	Nucor Steel: Darlington	0820-0001	NO2	91.96
Darlington	Royster-Clark Inc: Hartsville	0820-0003	NO2	3.97
Darlington	Sonoco: Hartsville	0820-0012	NO2	1,004.18
Darlington	Stingray Boats	0820-0040	NO2	0.24
Darlington	Wellman Ind: Palmetto	0820-0013	NO2	286.19
	1999 Darlington Co Total			6,928.55
	Emissions in Nonattainment Area-Total			0.00
	Emissions in Nonattainment Area-Percent			0.0%
Florence	APAC Carolina: #418 Florence	9900-0160	NO2	9.38
Florence	APAC Carolina: #422 Florence	9900-0217	NO2	4.32
Florence	Delta Mills: Pamplico/Cypress	1040-0011	NO2	3.50

Table D-1: Darlington & Florence Counties Point Source NO2 Emissions				
County	Plant Name	Permit Number	Pollutant	Point Source-NO2 (Tons Per Year)
Florence	Dupont: Teijin Films	1040-0015	NO2	216.65
Florence	Esab Welding & Cutting Products	1040-0013	NO2	1.95
Florence	Ingram Lumber Co	1040-0016	NO2	4.04
Florence	Interstate Brands Corp	1040-0089	NO2	2.66
Florence	Koppers, Inc: Florence	1040-0008	NO2	11.30
Florence	Marsh Lumber Co	1040-0010	NO2	7.16
Florence	Maytag: Florence Plant	1040-0067	NO2	4.63
Florence	McCall Farms	1040-0070	NO2	6.27
Florence	McLeod Medical Center	1040-0048	NO2	5.75
Florence	Palmetto Paving: Florence	9900-0337	NO2	3.49
Florence	Roche Carolina	1040-0076	NO2	3.30
Florence	Stone Container: Florence	1040-0003	NO2	2,935.78
Florence	Vulcraft Division Of Nucor	1040-0029	NO2	1.29
Florence	Wellman Inc: Main Plant & Recycling	1040-0006	NO2	21.39
Florence	Young Pecan Company	1040-0026	NO2	0.16
	1999 Florence Co Total			3,243.02
	Emissions in Nonattainment Area-Total			246.88
	Emissions in Nonattainment Area-Percent			8.2%

There are two major NO_x sources in Darlington County that are subject to the NO_x SIP Call, Sonoco and CP&L: Robinson. Sonoco has a 2004 ozone season NO_x budget estimated at 458 tons. CP&L: Robinson has a 2004 ozone season NO_x budget of 723 tons. There is only one facility in Florence County that is subject to the SIP Call, Stone Container. Stone Container has a 2004 ozone season NO_x budget estimated at 1,366 tons.

Table D-2 lists the VOC point sources that are in operation in Darlington and Florence Counties based on the 1999 NO_x and VOC emissions inventory i-Steps data. The county of Darlington has 12 VOC point sources in operation. None of the point sources are located within the nonattainment area. Florence County has 19 VOC point sources in operation and 15 are located within the nonattainment area.

Table D-2: Darlington & Florence Counties Point Source VOC Emissions				
County	Plant Name	Permit Number	Pollutant	Point Source-VOC (Tons Per Year)
Darlington	Chesterfield Lumber	0820-0045	VOC	141.72
Darlington	CP&L: Robinson	0820-0002	VOC	14.13
Darlington	Darlington Shredding	0820-0014	VOC	0.00
Darlington	Darlington Veneer	0820-0011	VOC	0.02
Darlington	Galey&Lord: Society Hill	0820-0010	VOC	534.48
Darlington	Georgia-Pacific Corp	0820-0006	VOC	41.47
Darlington	Hartsville Oil Mill	0820-0008	VOC	58.66

Table D-2: Darlington & Florence Counties Point Source VOC Emissions				
County	Plant Name	Permit Number	Pollutant	Point Source-VOC (Tons Per Year)
Darlington	Nucor Steel: Darlington	0820-0001	VOC	159.10
Darlington	Royster-Clark Inc: Hartsville	0820-0003	VOC	0.10
Darlington	Sonoco: Hartsville	0820-0012	VOC	191.32
Darlington	Stingray Boats	0820-0040	VOC	70.39
Darlington	Wellman Ind: Palmetto	0820-0013	VOC	191.91
	1999 Darlington Co Total			1,403.30
	Emissions in Nonattainment Area-Total			0.00
	Emissions in Nonattainment Area-Percent			0.0%
Florence	APAC Carolina: #418 Florence	9900-0160	VOC	4.50
Florence	APAC Carolina: #422 Florence	9900-0217	VOC	0.71
Florence	Delta Mills: Pamplico/Cypress	1040-0011	VOC	5.80
Florence	Dupont: Teijin Films	1040-0015	VOC	43.50
Florence	Esab Welding & Cutting Products	1040-0013	VOC	30.34
Florence	Interstate Brands Corp	1040-0089	VOC	79.41
Florence	Koppers, Inc: Florence	1040-0008	VOC	44.40
Florence	Marsh Lumber Co	1040-0010	VOC	0.55
Florence	Maytag: Florence Plant	1040-0067	VOC	7.39
Florence	McCall Farms	1040-0070	VOC	0.03
Florence	McLeod Medical Center	1040-0048	VOC	2.37
Florence	Palmetto Paving: Florence	9900-0337	VOC	2.55
Florence	Roche Carolina	1040-0076	VOC	0.07
Florence	Socar	1040-0086	VOC	149.98
Florence	Steelfab	1040-0092	VOC	9.98
Florence	Stone Container: Florence	1040-0003	VOC	1,375.85
Florence	Vulcraft Division Of Nucor	1040-0029	VOC	582.33
Florence	Wellman Inc: Main Plant & Recycling	1040-0006	VOC	41.18
Florence	Young Pecan Company	1040-0026	VOC	0.01
	1999 Florence Co Total			2,380.95
	Emissions in Nonattainment Area-Total			957.54
	Emissions in Nonattainment Area-Percent			40.2%

Table D-3 lists the NO_x on-road emissions for Darlington and Florence Counties and Table D-4 lists the VOC on-road emissions.

Table D- 3: Darlington & Florence Counties On-road NO_x Emissions

County	Tier 1	Tier 2	Highway NO _x (Tons Per Year)
Darlington	11-Highway Vehicles	01-Light-Duty Gas Vehicles & Motorcycles	1,086.00
Darlington	11-Highway Vehicles	02-Light-Duty Gas Trucks	606.00
Darlington	11-Highway Vehicles	03-Heavy-Duty Gas Vehicles	165.00
Darlington	11-Highway Vehicles	04-Diesels	1,545.00
	1999 Darlington Co Total		3,402.00
Florence	11-Highway Vehicles	01-Light-Duty Gas Vehicles & Motorcycle s	1,993.00
Florence	11-Highway Vehicles	02-Light-Duty Gas Trucks	1,101.00
Florence	11-Highway Vehicles	03-Heavy-Duty Gas Vehicles	292.00
Florence	11-Highway Vehicles	04-Diesels	2,589.00
	1999 Florence Co Total		5,975.00

Table D-4: Florence County On-road VOC Emissions

County	Tier 1	Tier 2	Highway VOC (Tons Per Year)
Darlington	11-Highway Vehicles	01-Light-Duty Gas Vehicles & Motorcycles	1,125.00
Darlington	11-Highway Vehicles	02-Light-Duty Gas Trucks	649.00
Darlington	11-Highway Vehicles	03-Heavy-Duty Gas Vehicles	156.00
Darlington	11-Highway Vehicles	04-Diesels	98.00
	1999 Darlington Co Total		2,028.00

E. Traffic and Commuting Patterns

Estimates of the Daily Vehicle Miles Traveled (DVMT) were obtained from the South Carolina Department of Transportation (SCDOT). SCDOT determines current DVMT by multiplying traffic volume (through traffic counts) and lane miles (determined by the Highway Performance Monitoring System) for each particular area. The South Carolina Department of Public Safety, Division of Motor Vehicles, provided motor vehicle registration data. All other data in this section were obtained from the US Census Bureau. All data is based on the year 2000.

Table E-1: DVMT for Florence Nonattainment Area.⁵

County	2000 DVMT	2025 DVMT	DVMT Change (2000-2025)	Projected % Annual Change
Florence	4,228,587	6,318,159	2,089,572	1.98
Darlington	2,007,033	2,909,582	902,550	1.80
County Total	6,235,620	9,227,741	2,992,122	1.92

⁵ Data provided by SCDOT.

Table E-1: DVMT for Florence Nonattainment Area.⁵				
County	2000 DVMT	2025 DVMT	DVMT Change (2000-2025)	Projected % Annual Change
Florence Nonattainment Total ⁶	2,643,724	4,336,050	1,692,326	2.56
% DVMT Captured inside MPO boundary	42.40	47.00		

There are eight major routes of travel through Darlington and Florence Counties. They include two interstates (I-20, and I-95), and six US Highways (US 76, US 401, US 301, US 378, US 15 and US 52). Both interstates are located within the Florence Nonattainment Area. There are also numerous State and secondary roads in the area that connect the larger towns. I-20 terminates in Florence and is the major corridor of travel to Columbia, South Carolina.

Table E-2⁷ presents the breakdown by road classifications of DVMT traveled in the Florence Nonattainment Area counties from 2000 and projected through 2025.

Table E-2: DVMT Data for Florence Nonattainment Area Counties				
	2000	Projected 2007	Projected 2012	Projected 2025
Darlington County				
Rural Interstate (01)	334,983	420,863	482,205	641,696
Rural Principal Arterial (02)	433,026	473,555	500,628	586,074
Rural Minor Arterial (03)	215,307	235,459	248,919	291,405
Rural Major Collector (04)	435,277	476,017	503,230	589,121
Rural Minor Collector (05)	25,263	27,628	29,207	34,192
Rural Local (09)	247,639	270,817	286,299	335,165
Rural Total	1,691,496	1,904,339	2,050,489	2,477,653
Urban Interstate (11)	26,775	30,788	33,655	41,108
Urban Freeway/Expressway (12)	-	-	-	-
Urban Principal Arterial (13)	14,527	15,887	16,795	19,661
Urban Minor Arterial (14)	177,581	194,202	205,304	240,345
Urban Collector (15)	43,336	47,392	50,101	58,652
Urban Local (18)	53,318	58,308	61,642	72,163
Urban Total	315,537	346,577	367,496	431,929
Grand Total DVMT	2,007,033	2,250,916	2,417,985	2,909,582
Florence County				
Rural Interstate (01)	949,641	1,169,281	1,326,166	1,734,069
Rural Principal Arterial (02)	638,746	707,942	750,434	888,624
Rural Minor Arterial (03)	368,850	408,808	433,345	513,145
Rural Major Collector (04)	612,277	678,605	719,336	851,800

⁶ Florence Nonattainment Area totals based on MPO figures and may reflect an underestimation of the total percent captured by the boundary.

⁷ Data provided by SCDOT.

	Table E-2: DVMT Data for Florence Nonattainment Area Counties			
	2000	Projected 2007	Projected 2012	Projected 2025
Rural Minor Collector (05)	80,672	89,412	94,778	112,231
Rural Local (09)	273,651	303,296	321,500	380,703
Rural Total	2,923,837	3,357,343	3,645,560	4,480,572
Urban Interstate (11)	81,478	96,679	107,537	135,768
Urban Freeway/Expressway (12)	35,778	39,654	42,034	49,774
Urban Principal Arterial (13)	457,457	507,013	537,445	636,414
Urban Minor Arterial (14)	433,570	480,539	509,382	603,183
Urban Collector (15)	209,219	231,884	245,802	291,066
Urban Local (18)	87,249	96,700	102,504	121,380
Urban Total	1,304,750	1,452,470	1,544,705	1,837,586
Grand Total DVMT	4,228,587	4,809,814	5,190,265	6,318,159

Table E-3⁸ presents the 2000 worker flow data from each of the counties. Some counties that are listed on this table are not being considered for boundary recommendations and are being included on this chart to account for all workers in each county. This table shows that 89.66% of the workers in Florence and Darlington Counties commute between those two counties. This verifies that while there is a significant amount of DVMT in both of the counties, only a minimal amount of it is traveled by workers commuting outside the area.

Table E-3: Where People Work Who Live In SC				
County Worked In	County of Residence			
	Darlington	Florence	Out of State	Grand Total
Grand Total	28,234	54,482	611	83,327
Aiken	9	4		13
Anderson	6	14		20
Beaufort	12	17		29
Berkeley	7	26		33
Charleston	13	110		123
Chester		8		8
Chesterfield	870	133		1,003
Clarendon		273		273
Darlington	17,609	3,214	187	21,010
Dillon	59	380		439
Dorchester		31		31
Fairfield	8			8
Florence	7,853	45,491	424	53,768
Georgetown	22	213		235
Greenville	30	41		71
Hampton		12		12

⁸ Data provided by US Census: 2000.

Table E-3: Where People Work Who Live In SC				
County Worked In	County of Residence			
	Darlington	Florence	Out of State	Grand Total
Horry	154	785		939
Kershaw	147	45		192
Lancaster	6	8		14
Laurens		4		4
Lee	318	240		558
Lexington	35	99		134
Marion	69	474		543
Marlboro	282	156		438
Orangeburg		16		16
Out of State	350	580		930
Pickens		12		12
Richland	120	326		446
Spartanburg	49			49
Sumter	198	396		594
Williamsburg	8	1,349		1,357
York		25		25

Figure E-1:
Florence and Darlington Counties:
Time Leaving Home to Go to Work

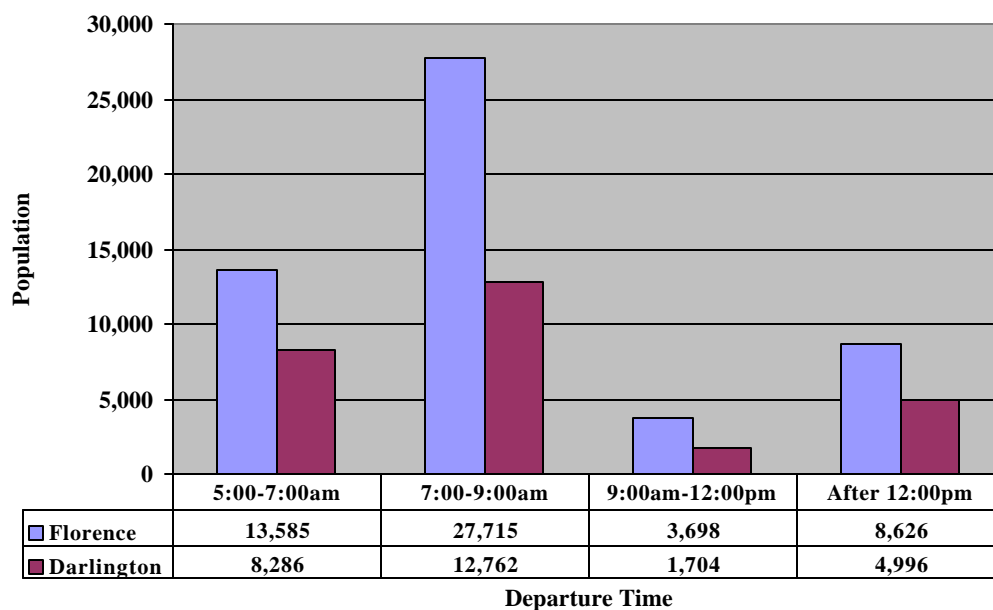
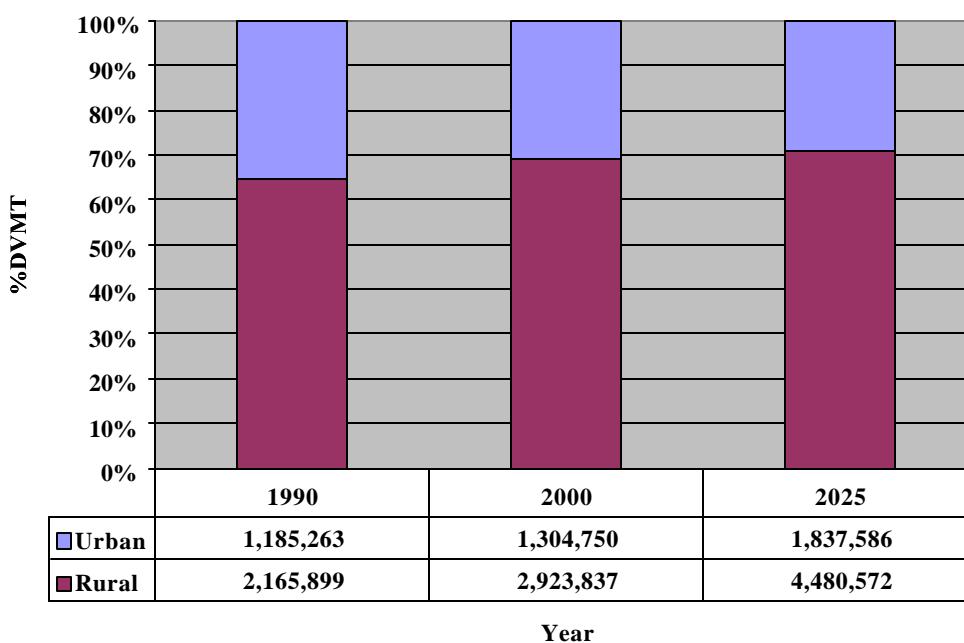


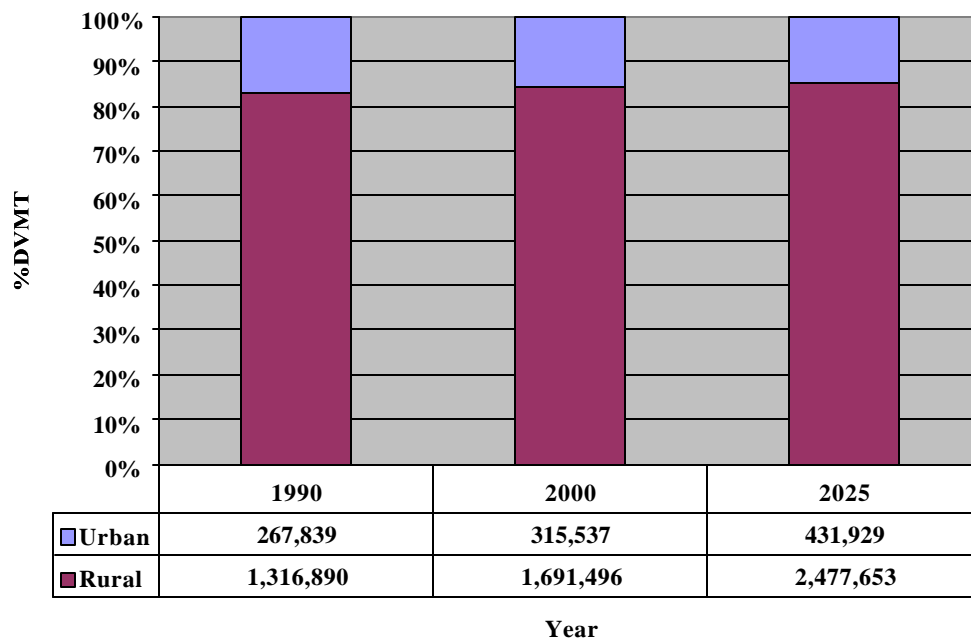
Figure E-1⁹ presents the departure times for workers in Florence and Darlington Counties. The figure shows that the largest amount of traffic occurs between 7:00 am to 9:00 am. Note that Florence County contributes the largest amount of traffic during these times and this county makes up the majority of the landmass of the Florence Area boundary. It should also be noted that ozone formation is believed to begin formation in this area starting around the morning hours and continuing throughout the day until sunset. This is important (since the majority of the traffic is contributed from Florence County and this traffic occurs during the typical start of ozone formation) because it suggests that the mobile source emission of NO_x and VOC that help contribute to the ozone formation is mainly from the commuters that reside inside the Florence Nonattainment Area.

Figure E-2: Urban vs. Rural DVMT for Florence County



⁹ Data provided by US Census: 2000.

Figure E-3: Urban vs. Rural DVMT for Darlington County



Figures E-2 and E-3¹⁰ show that there is very little urban DVMT in either county. This shows why only small portions of each county were included inside the boundary.

¹⁰ Data provided by US Census: 2000.

Figure E-4: 2000 Motor Vehicle Registration for Florence and Darlington Counties

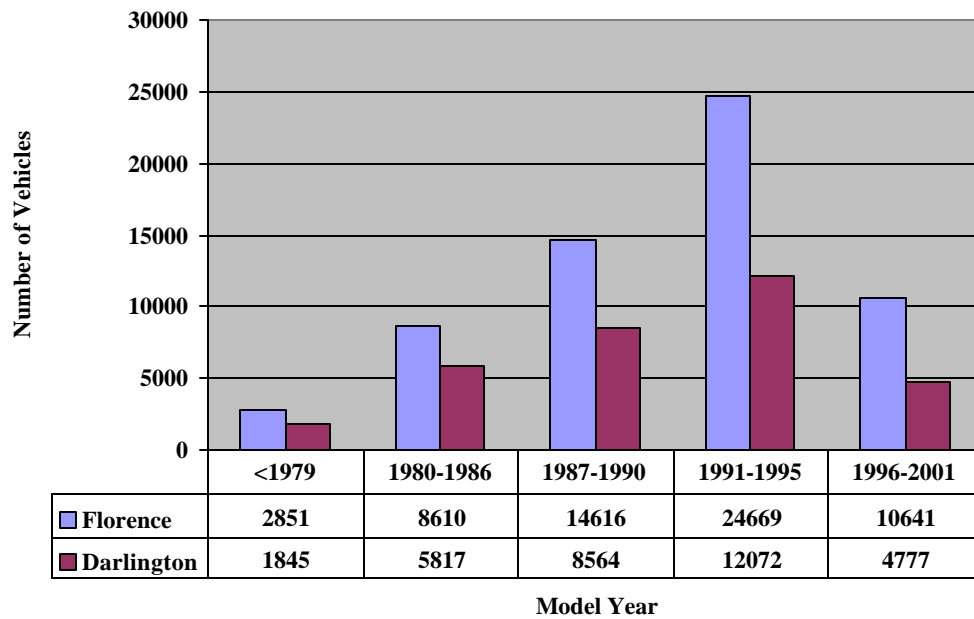


Figure E-4¹¹ presents the motor vehicle registration data for Florence and Darlington Counties. Only a small portion of the vehicles are pre-1981 model years. In 1981 new cars were outfitted with three-way catalysts, on-board computers, and oxygen sensors to help increase the efficiency of the catalytic converters. This figure shows that the majority of cars registered are model years 1991-1995. In 1991 the EPA established lower tailpipe standards for hydrocarbons and nitrogen oxides beginning with 1994 model year vehicles.

This data reflects 2000 registration figures, and many vehicle owners will elect to replace vehicles with newer vehicles in the coming years. These vehicle turnovers, combined with future national low sulfur fuel standards, the use of Onboard Diagnostic (OBD) systems, and Onboard Vapor Recovery (ORVR) systems will help to offset any potential impacts from the increased emissions from mobile sources in this area.

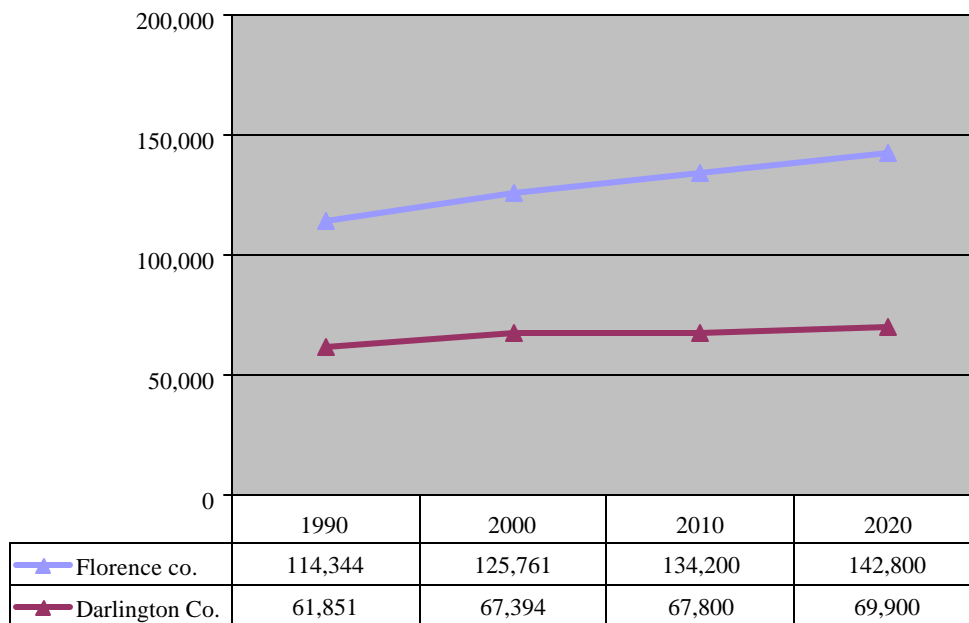
F. Expected Growth (Including Extent, Pattern, and Rate of Growth)

Limited data is available in assessing expected growth for the Florence Nonattainment Area boundary. Conclusions were drawn based on historical data from 1990, current data from 2000, and population projections for 2010 and 2020 as contained in Table F-1. Economic growth, relative to population growth, is even harder to predict. No knowledge of major economic expansions is available. While it is certain that population counts will grow, it is only assumed that current economic factors will remain stable or that some economic growth will occur. It is reasonable to expect the majority of that growth to be located inside, or at least near, the boundary.

¹¹ Data provided by South Carolina Department of Public Safety: Division of Motor Vehicles.

Table F-1: Historical and Projected Population and Population Density per County		
	Florence County	Darlington County
Population, 1990 ¹²	114,344	61,851
Population, 2000 ¹³	125,761	67,394
Projected Population, 2020 ¹⁴	142,800	69,900
Population Growth Rate, 1990 – 2000 (Persons per 5 Years)	5708.5	2771.5
Projected Population Growth Rate, 2000 - 2020 (Persons per 5 Years)	4259.8	626.5
Land Area (Sq. Miles)	800	561
Persons per Sq. Mile, 2000	157.2	120.1
Projected Persons per Sq. Mile, 2020	178.5	124.6
Urban Population, 2000	72,929	30,579
% Urban Population, 2000	58	45.4
Rural Population, 2000	52,832	36,815
% Rural Population, 2000	42	54.6

Figure F-1
Population Growth by County, 1990 - 2020

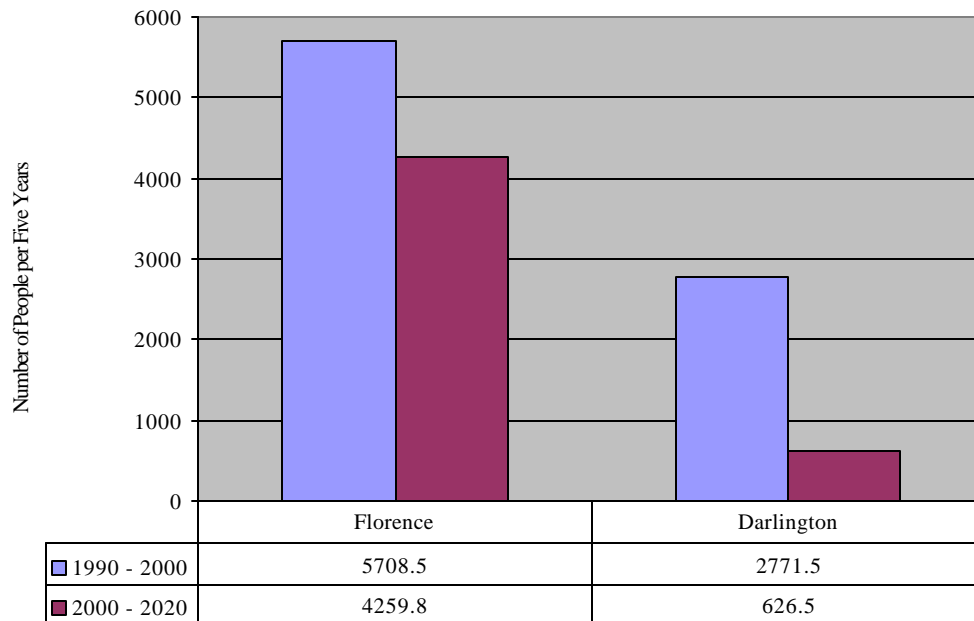


¹² Data provided by US Census: 2000.

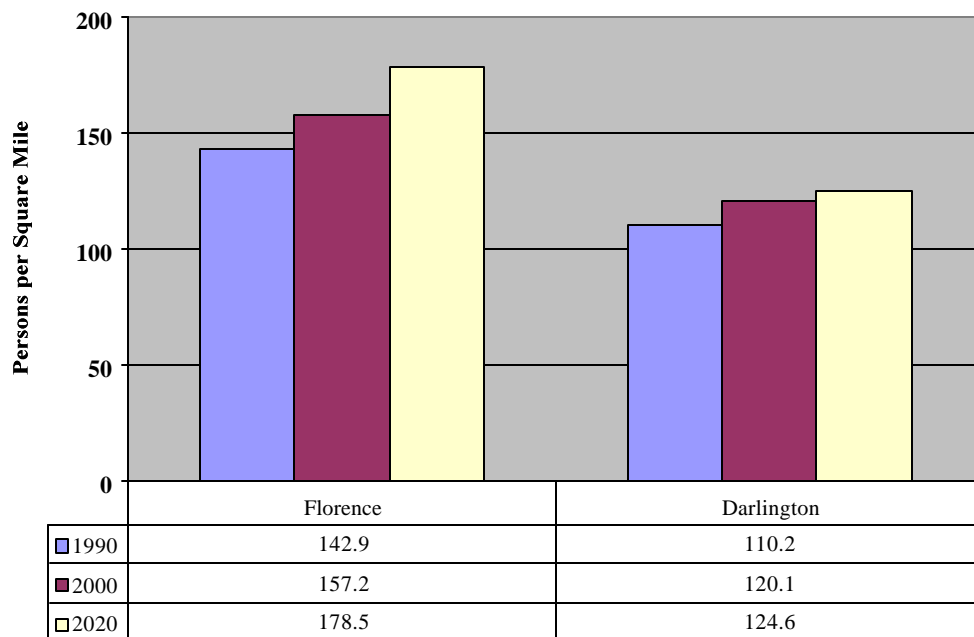
¹³ Data provided by US Census: 2000.

¹⁴ Data provided by EPA.

**Figure F-2
Population Growth, 1990 - 2020**



**Figure F-3
Historical and Projected Population Density**



Figures F-1, F-2, and F-3 show historical and projected data for total population, rate of growth, and population density, respectively, for Florence and Darlington Counties. Since the Florence Nonattainment Area boundary already captures the area's urban population and contains portions of the manufacturing and retail trade, it is reasonable to conclude that the boundary at least approximates, if not contains, the expected population growth, and hence the economic growth, for the area in the coming years.

It should be noted that trends are based on projected data for 2020. The population will grow in each county; however, comparing the population increase per five years over the last ten years (1990 – 2000) to the projected population increase per five years over the next twenty years (2000 – 2020) shows that the rate of growth slows for Florence and Darlington Counties. Since the recommended area includes the urbanized portion of Florence and Darlington Counties, it is assumed that the Florence Nonattainment Area will encompass the majority of expected population growth.

The manufacturing sector employs the most people in both Florence and Darlington Counties.¹⁵ Health care and social assistance and retail trade are the second and third largest employers in Florence County, respectively, while retail trade and health care and social assistance are second and third in Darlington County, respectively.

G. Meteorology

See Section V - G of Introduction.

H. Topography

See Section V - H of Introduction.

I. Jurisdictional Boundaries

The Florence Nonattainment Area boundary includes all portions of the Florence MPO and an additional (contiguous) portion around the Pee Dee Experimental Station ozone monitoring site, which is located in Darlington County.

Starts at I-95 at Great Pee River / Florence/Marlboro county line.

Follows Great Pee Dee River/Florence/Marlboro/Dillon county line southeast for 3.5 miles to Schoolhouse Branch.

Follows Schoolhouse Branch west and south for 4.1 miles to Jamestown Rd.

Follows Jamestown Rd south for 0.9 miles to S-21-24 (E. Old Marion Rd).

Follows S-21-24 (E. Old Marion Rd) west for 0.6 miles to S-21-165 (N. Firetower Rd).

Follows S-21-165 (N. Firetower Rd) south for 5.2 miles across US 76/301 to S-21-13 (Bethel Rd).

Follows S-21-13 (Bethel Rd) east for 0.2 miles to Middle Branch.

Follows Middle Branch south for 0.4 miles to Jeffries Creek.

Follows Jeffries Creek southeast for 2.6 miles to S-21-24 (Paper Mill Rd).

Follows S-21-24 (Paper Mill Rd) west and southwest for 1.3 miles to S-21-57 (Old River Rd).

Follows S-21-57 (Old River Rd) southeast for 0.1 miles to Willow Creek.

Follows Willow Creek west and southwest for 3.4 miles to railroad tracks.

Follows railroad tracks northwest for 0.5 miles to S-21-575 (Francis Marion Rd).

Follows S-21-575 (Francis Marion Rd) north for 0.4 miles to US 327.

¹⁵ Data provided by US Census: 2000.

Follows US 327 southwest 0.4 miles to railroad tracks.
 Follows railroad tracks northwest 0.3 miles to Ben Ingram Rd.
 Follows Ben Ingram Rd south for 0.3 miles to US 327.
 Follows US 327 southeast for 0.4 miles to S-21-1613 (Megan Rd).
 Follows S-21-1613 (Megan Rd) northwest for 1.7 miles to S-21-551 (Flowers Rd).
 Follows S-21-551 (Flowers Rd) southwest for 1.0 mile to SC 51 (Pamplico Hwy).
 Follows SC 51 (Pamplico Hwy) northwest for 0.5 miles to S-21-552 (Branch Rd).
 Follows S-21-552 (Branch Rd/Poor Farm Rd) west for 4.6 miles to US 52(Irby St).
 Follows US 52 (Irby St) southeast for 0.2 miles to W. Christy Ln.
 Follows W. Christy Ln west for 0.2 miles to S-21-100 (McLaughlin Rd).
 Follows S-21-100 (McLaughlin Rd) southwest for 1.0 mile to S-21-1139 (Hill Harrell Rd).
 Follows S-21-1139 (Hill Harrell Rd) west for 1.2 miles to S-21-136 (Stagecoach Rd).
 Follows S-21-136 (Stagecoach Rd) northwest for 0.6 miles to Dock Broach Ln.
 Follows Dock Broach Ln west for 0.4 miles to S-21-35 (W. John Paul Jones Rd).
 Follows S-21-35 (W. John Paul Jones Rd) southwest for 1.6 miles to S-21-848 (W. Cummings Rd).
 Follows S-21-848 (W. Cummings Rd) northwest for 2.1 miles to S-21-45 (Penial Rd).
 Follows S-21-45 (Penial Rd/N. Sally Hill Rd) northwest for 8.0 miles over I-95 and US 76 to Florence/Darlington county line.
 Follows Florence/Darlington county line northeast for 7.4 miles over I-20 to US 52 (Lucas St).
 Follows US 52 (Lucas St) northwest for 0.3 miles to S-16-1243 (Aberdeen Dr).
 Follows S-16-1243 (Aberdeen Dr) northeast for 0.3 miles to S-16-1137 (National Ave).
 Follows S-16-1137 (National Ave) northwest for 0.4 miles to S-16-408 (Palmetto Rd).
 Follows S-16-408 (Palmetto Rd) northeast for 1.0 mile to S-16-937 (Piano Rd).
 Follows S-16-937 (Piano Rd) northeast for 1.2 miles to S-16-35 (Charleston Rd).
 Follows S-16-35 (Charleston Rd) north for 0.7 miles to unnamed stream.
 Follows unnamed stream north and East to S-16-35 (Charleston Rd).
 Follows S-16-35 (Charleston Rd) northeast AII-SG-012 (Long Marsh).
 Follows AII-SG-012 (Long Marsh) east to S-16-0495 (Georgetown Rd).
 Follows S-16-0495 (Georgetown Rd) south to Florence/Darlington County Line.
 Follows Florence/Darlington county line northeast for 1.2 miles to Fountain Branch Creek.
 Follows Fountain Branch Creek north for 1.4 miles (past S-16-495) to Alligator Creek.
 Follows Alligator Creek east for 3.7 miles to Great Pee Dee River/Darlington/Marlboro county line.
 Follows Great Pee Dee River/Darlington/Marlboro/Florence county line east to I-95 and starting point.

J. Level of Control of Emission Sources

Through its participation with the Early Action Compact, Darlington County is exploring local control strategies such as an ozone action coordinator, alternative fuels, open burning restrictions, fleet replacement, community awareness, energy conservation, and mowing restrictions. Florence County is exploring local control strategies such as alternate work schedules, park and ride facilities, idling policy, alternative fuels, energy education, and open burning restrictions.

K. Regional Emissions Reductions

See Section V of Introduction.